$b' = \pm 1$, $b'' = \pm 3$; and the four roots of $C' = 0$ are,
$x_3 = 1 + \sqrt{-1}$, $x_4 = 1 - \sqrt{-1}$, $x_5 = -2 + 3\sqrt{-1}$, $x_6 = -2 - 3\sqrt{-1}$.
Therefore the seven roots of (1) are as follows:

$$x_1 = 2,\ x_2 = 3,\ x_3 = 1 + \sqrt{-1},\ x_4 = 1 - \sqrt{-1}$$
$$x_5 = -2 + 3\sqrt{-1},\ x_6 = -2 - 3\sqrt{-1},\ x_7 = -3 + 5\sqrt{1};$$

and $-(x_1 + x_2 + x_3 + \ldots x_7) = A_1 + B_1\sqrt{-1} = +(0 - 5\sqrt{-1})$;
$-(x_1 \,.\, x_2 \,.\, x_3 \ldots x_7) = A_{2n+1} + B_{2n+1}\sqrt{-1} = 468 - 780\sqrt{-1}$.

B. $X = x^3 - (7 + 5i)x_2 + (19 + 30i)x - (13 + 65i) = 0$.

Here $N = -5x^2 + 30x - 65 = 0$, or $N = x^2 - 6x + 13 = 0$; and $B_1 = b_{n+1} = +5$, $A_1 - B_2 \div B_1 = -a_{n+1} = -7 + 6 = -1$,

$$a_{n+1} \pm b_{n+1}\sqrt{-1} = 1 \pm 5\sqrt{-1}.$$

$X = 0$ is divisible by $[x - (1 + 5\sqrt{-1})]$ only, therefore $x^3 = 1 + 5\sqrt{-1}$ is a root of $x = 0$, and we have $X \div (x - x_3) = N = 0$.

Introducing in this equation $x = a + bi$, we get

$N' = a_1^2 - b_1^2 - 6a_1 + 13 + (2a_1b_1 - 6b_1)\sqrt{-1} = 0$; and
$(A)\quad a_1^2 - b_1^2 - 6a_1 + 13 = 0,\qquad (B)\quad 2a_1b_1 - 6b_1 = 0.$

(B) gives $a_1 = 3$, and (A) gives $b_1 = \pm 2$; therefore the roots of $N = 0$ are $x_1 = 3 + 2\sqrt{-1}$, $x_2 = 3 - 2\sqrt{-1}$, and the three roots of $X = 0$ are $x_1 = 3 + 2\sqrt{-1}$, $x_2 = 3 - 2\sqrt{-1}$, $x_3 = 1 + 5\sqrt{-1}$; and

$$-(x_1 + x_2 + x_3) = -(7 + 5\sqrt{-1}) = A_1 + B_1\sqrt{-1},$$
$$-(x_1 \,.\, x_2 \,.\, x_3\quad) = -(13 + 65\sqrt{-1}) = A_{2n+1} + B_{2n+1}\sqrt{-1}.$$

Note by Artemas Martin.—I have discovered that the formula given by me at the top of page 119, No. 7, Vol. I of the Analyst, holds only when $n = 2$.

Since the equation $\sqrt{a} = \dfrac{a}{r_m}\left[1 - \left(\dfrac{R_m}{a}\right)\right]^{\frac{1}{2}}$, where $R_m = a - r_m^2$, is identical, it should be written, to reduce r_m and R_m to integers,

$$\sqrt{a} = \frac{(10)^m a}{(10)^m r_m}\left[1 - \frac{(10)^{2m}\left(\frac{R_m}{a}\right)}{(10)^{2m}}\right]^{\frac{1}{2}}.$$

The formula for the nth root is

$$\sqrt[n]{a} = \frac{a}{r_m}\left[1 - \left(\frac{S_m}{a}\right)\right]^{\frac{1}{n}},\ \text{where } S_m = a^{n-1} - r_m^n;$$

but it does not appear to be of any practical use except when $n = 2$.